ACUTE EXPOSURE GUIDELINE LEVELS FOR SULFUR CHLORIDE (CAS NO. 10025-67-9)

PRESENTED BY

KOWETHA DAVIDSON
Oak Ridge National Laboratory

NAC/AEGL MEETING, SAN ANTONIO, TX DECEMBER 10-12, 2003

SULFUR CHLORIDE CAS NO. 10025-67-9

COMMON SYNONYMS:

Sulfur monochloride, disulfur dichloride

PHYSICAL CHARACTERISTICS:

- Light amber to yellowish red, fuming, oily liquid
- Vapor pressure: 6.7 torr @ 20°C
- Vapor density: 4.66 (air = 1)
- Soluble in organic solvents
- Conversion: 1 ppm = 0.181 mg/m3

<u>'</u>

1

DESCRIPTION

- Decomposes primarily to hydrogen chloride, sulfur dioxide, and sulfur in water or moist environment
- ODOR: irritating, suffocating, penetrating, nauseating
- ODOR DETECTION THRESHOLD: No data

٦

HUMAN DATA

- Irritation threshold: 2-66 ppm
- Considered an upper respiratory tract irritant in humans
- Upper respiratory tract irritation may be due to decomposition products

ANIMAL DATA

Bomhard et al., 2000

Study type: 4-hour inhalation
Species/Strain: rat/strain not reported
males and females
(5 of each sex/group)

Observation period: 14 days
Endpoints: clinical signs, body weight, mortality, gross pathologic changes

Results

44 ppm no effects

1016 ppm no effects

7369 ppm bloody and serous nasal discharge, breathing difficulty, piloerection, reduced activity, and ungroomed fur (signs of discomfort)

9511 ppm same as 7369 ppm but probably more severe, no deaths

Results (Cont.)

13,800 ppm: 3/10 died, breathing difficulty, cyanosis,

corneal opacity, necrosis in the nose; emphysema, pulmonary edema, effects

in liver and spleen, gastrointestinal

irritation.

15,842 ppm: 6/10 died; other effects same as

described above

19, 248 ppm: 0/10 died; other effects same as

described above

/ **=**

AEGL -1 VALUES

10 min	30 min	1 hour	4 hour	8 hour
20 ppm	20 ppm	16 ppm	10 ppm	5.1 ppm
[3.6 mg/m ³]	[3.6 mg/m ³]	[2.9 mg/m ³]	[1.8 mg/m3]	[0.9 mg/m ³]

Key Reference: Bomhard, E.; Loser, E., and Pauluhn, J. 2000. Acute toxicologic evaluation of disulfur dichloride. Int. J. Toxicol. 19: 342.

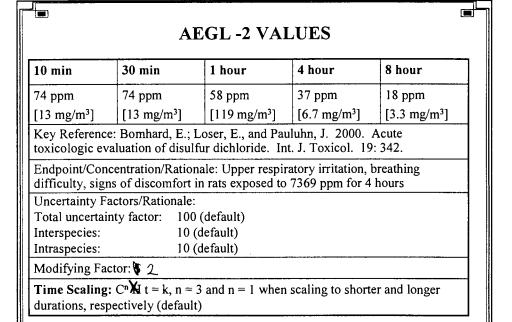
Endpoint/Concentration/Rationale: NOEL for upper respiratory irritation, breathing difficulty, signs of discomfort in rats exposed to 1016 ppm for 4 hours

Uncertainty Factors/Rationale:

Total uncertainty factor: 100 (default)
Interspecies: 10 (default)
Intraspecies: 10 (default)

Modifying Factor: 1

Time Scaling: $C^n \times t = k$, n = 3 and n = 1 when scaling to shorter and longer durations, respectively (default)



AEGL -3 VALUES								
10 min	30 min	1 hour	4 hour	8 hour				
180 ppm	180 ppm	143 ppm	90 ppm	45 ppm				
[33 mg/m ³]	[33 mg/m ³]	[26 mg/m ³]	[16 mg/m ³]	[8.1 mg/m ³]				
toxicologic evaluation Endpoint/Cond		ur dichloride. Ir	or lethality (LC ₀					
Uncertainty Factors/Rationale: Total uncertainty factor: 100 (default) Interspecies: 10 (default) Intraspecies: 10 (default)								
Interspecies:	,	,						
Interspecies:	10 (d	,						
Interspecies: Intraspecies: Modifying Factories	10 (d	$\frac{\text{default}}{\text{and } n = 1 \text{ wher}}$	scaling to short	er and longer				

DATA ADEQUACY FOR SULFUR CHLORIDE

Only one acute inhalation study was available for deriving AEGLs.

The study showed clear concentration-response relationships for lethal and non-lethal effects.

The report provided no information on exposure conditions, analytical verification of chamber concentrations, or estimates of decomposition products.

Default uncertainty factors were used in acknowledgment of the lack of additional data.

11 =

Proposed AEGL Values For Sulfur Chloride (ppm [mg/m³])

Class.	10 min.	30 min.	1 hour	4 hours	8 hours	Endpoint
AEGL-1	20 [3.6]	20 [3.6]	16 [2.9]	10 [1.8]	5.1 [0.9]	No effect level
AEGL-2	74 [13]	74 [13]	58 [11]	37 [6.7]	18 [3.3]	Upper respir. irrit. & dyspnea
AEGL-3	180 [33]	180 [33]	143 [26]	90 [16]	45 [8.1]	Lethality threshold

2

